

## WAFER BONDED EPITAXIAL TEMPLATES FOR SILICON HETEROSTRUCTURES

### Abstract of the Disclosure

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A heterostructure device layer is epitaxially grown on a virtual substrate, such as an InP/InGaAs/InP double heterostructure. A device substrate and a handle substrate form the virtual substrate. The device substrate is bonded to the handle substrate and is composed of a material suitable for fabrication of optoelectronic devices. The handle  
10 substrate is composed of a material suitable for providing mechanical support. The mechanical strength of the device and handle substrates is improved and the device substrate is thinned to leave a single-crystal film on the virtual substrate such as by exfoliation of a device film from the device substrate. An upper portion of the device film exfoliated from the device substrate is removed to provide a smoother and less defect  
15 prone surface for an optoelectronic device. A heterostructure is epitaxially grown on the smoothed surface in which an optoelectronic device may be fabricated.